

Zero Retries issue 0048 2022-05-27

Technological innovation in Amateur Radio - Data Communications; Space; Microwave... the fun stuff! The Universal Purpose of Ham Radio is to have fun messing around with radios - Bob Witte K0NR. Ultimately, amateur radio must prove that it is useful for society - Dr. Karl Meinzer DJ4ZC. We are confronted by insurmountable opportunities! - Pogo. Nothing great has ever been accomplished without irrational exuberance - Tom Evslin. Irrational exuberance is pretty much the business model of Zero Retries Newsletter - Steve Stroh N8GNJ. What's life without whimsy? - Dr. Sheldon Cooper.

Zero Retries is a unique, quirky little highly independent, opinionated, self-published email newsletter about technological innovation in Amateur Radio, for a self-selecting niche audience, that's free (as in beer) to subscribe.

About Zero Retries

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Request To Send

Hamvention 2022 is a wrap - no more countdowns (until next Spring).

As I begin writing this issue on Sunday 2022-05-22 in my air conditioned room, my feet are still swollen from much walking and standing, my neck is sore from sunburn where I forgot to apply sunscreen, and my mind is awash from all the impressions of two days of immersion in Amateur Radio. Even without much that was explicitly "Zero Retries Interesting" there was more than enough to keep me busy and enough to report out that I'll probably overflow.

You'd think that with 8 hours on Friday, 8 hours on Saturday, and 2 hours (effectively) on Sunday, you'd have enough time to see all the commercial vendor exhibits, but that's not the case. I got sidetracked into unexpected interesting conversations, spent time cooling off my swollen feet, and and of course, the Forums.

But, more than any previous Hamvention, you no longer need to be physically present to get a reasonable feel for what was there - just check out [YouTube](#) and you'll have *many* hours of video to watch, as will I, in the weeks after I return home. It was amazing to me the number of folks that were recording Hamvention 2022 for posterity... and their audiences. My attendance at Hamvention came in the latter phase of a personal cross-country car trip, and thus this issue of Zero Retries will suffer a bit from being written in a few late nights in hotel rooms when I'm not-quite exhausted.

One thing that has remained a constant of Hamvention from Dayton's Hara Arena to Xenia's Green County Fairgrounds is that Ohio weather dominates Hamvention. Rain on Thursday and Friday morning dampened enthusiasm for the Flea Market which was almost entirely on grass which quickly transitioned to mud in places. By Saturday morning, the Flea Market was reasonably accessible (minimal mud), but heavy weather was threatened by mid-afternoon, and when the weather reports warned of heavy rain approaching, many Flea Market vendors took that as a sign to close up and depart (while their vehicles could still get traction on grass, rather than mud). One dismaying aspect reminiscent of one of the worst aspects of Hara Arena was the appallingly bad condition of some of the "paved" portions of the Flea Market area, with large chunks of failed pavement laying around randomly. If you weren't carefully watching where to step and avoid those chunks for us on two feet, you could easily step on a chunk and have your leg disappear out from under you. Those pavement chunks were a nightmare for the Hamvention attendees those in power chairs, scooters, and wheelchairs. *Surely* Green County Fairgrounds and Hamvention can afford to do a better job with those portions of pavement considering the very, very high foot (and wheeled) traffic in the Flea Market area on Hamvention weekend.

My new iPhone 13 Pro Max largely proved up to the challenge of recording a lot of video / audio and photos from Hamvention weekend... especially that 1 TB of storage. After nearly a month of travel, including recording a lot of video at Hamvention, "Available" is at 948.06 GB. However, I also learned at Hamvention that I'm not yet up to the challenge of *optimally operating it*. I recorded a lot of video / audio, but that precluded taking photos while I was recording video. Eventually I can excerpt photos from the videos. I should have taken more photos. Another conclusion is that while that big battery works well, it's not infinite, thus if I'm going to be recording a lot of video, I'm going to need some supplemental power. Another conclusion was that I need a better platform than a short "selfie stick" to hold the iPhone 13 during video recording, such as a lightweight tripod. I saw some of the "pro video" folks using impressive iPhone-based video rigs that included an external power pack, a tripod (even one on wheels), and external directional microphones via dongles (to allow simultaneous audio input and charging). Thus, while the iPhone 13 Pro Max certainly worked for recording some casual videos and photos... it *may* be more practical to just resort back to a camcorder that is better optimized for the purpose. But more experimentation is warranted before making that decision.

One big question you might be curious about is if I got a chance to make my pitch to Gerald or Matt Youngblood of FlexRadio (see Zero Retries 0043)?

Yes, I did get a few minutes face to face with Matt Youngblood to plead my case for a FlexRadio VHF / UHF Radio. I promised to follow up with a detailed email, which will have to wait until I return to Bellingham - I'll only have that one shot and will have to make it count.

This issue is a glancing blow of just a few highlights of Hamvention 2022 - more in subsequent issues. Turns out (surprise!) I'm just not nearly as productive "on the road" as I am at my office where my workflow is much more optimized.

de Steve N8GNJ

Digital at Hamvention 2022? Not much.

In the vendor exhibit areas, Digital (data) was almost entirely absent, other than the numerous Digital Mobile Radio (DMR) digital voice mobile and portable radios for sale, and the exhortations from Icom and Yaesu that their > \$1k HF radios were based on "Software Defined Radio" technology. And of course, the Icom SHF-P1 - see below. There was the TAPR Forum on Friday, and the Digital Modes Forum on Saturday afternoon.

Even in the flea market (of which I saw perhaps 50%), there were very few data devices. I saw exactly one "interesting" TNC - a Kantronics KPC-9612, for \$25... which I bought.

That... is a **problem!** More on that later.

The Big ~~Five~~ Four Radio Manufacturers at Hamvention 2022

Elecraft, FlexRadio, Icom, and Yaesu were present at Hamvention 2022. Kenwood was not. Kudos to Elecraft, FlexRadio, Icom, and Yaesu for showing up. Raspberries to Kenwood for not showing up.

Not knowing what to expect of Hamvention after a two-year hiatus, I didn't make a real plan to survey all the vendors, and thus there are some gaps in my observations. I did not check out Elecraft and Yaesu for Zero Retries Interesting new products, but I did not hear any new "buzz" about anything with them.

I did spend some time with my daughter Merideth KK7BKI in front of a FlexRadio Maestro and 6400M explaining to her what was different about this concept of radio. Yes, there are other manufacturers doing "Software Defined Radio", but in my opinion, FlexRadio is *very serious*, *all-in* on Software Defined Radio, and that when I'm ready for a significant investment in HF gear within the year, I will be investing in FlexRadio units.

Icom SHF Project / SHF-P1



Icom SHF-P1 Concept Unit at Hamvention 2022 - Scott Honaker N7SS Photo by Steve Stroh N8GNJ)

What Icom displayed at Hamvention for the “SHF Project” might as well have been a mockup made of carved styrofoam. It was a mockup, not functional, and was not necessarily meant to be representational of what this unit will eventually become... *if* it ever comes to market. Talking to the Icom exhibit staff, it quickly became apparent that:

- The Icom exhibit staff knew nothing (were not given any additional information) about this unit beyond what was on the double-sided handout available at Hamvention.
- The primary purpose of this unit to be at Hamvention was simply to be a conversation starter with Hamvention attendees about what features they would like to see included in such a radio, especially what bands beyond 1240 - 1300 MHz (available on the Icom IC-9700).

The accompanying one-pager released at Hamvention states that the “SHF-P1” will include 2.4 GHz and 5.6 GHz bands (and a GPS receiver). Although there was no explicit mention in the one-pager, Icom’s exhibit staff stated that there may be other versions of this radio for other “SHF” (Super High Frequency) Amateur Radio bands. One Icom rep was keeping a tally of bands they heard requested on a scrap piece of paper.

A lot of Hamvention attendees were confused that Icom used a (modified) Icom IC-705 as the control head / power supply for this system, and thought that the unit *was* an IC-705 and the tower unit was a transverter, rather than a 2.4 GHz / 5.x GHz radio.

The one key piece of information answered in the one pager that had not been mentioned in previous [SHF Project Updates](#) is what modes Icom plans to offer on the SHF-P1:

All modes including the DV/DD Modes

Icom's DV (Digital Voice) mode is 4800 bps with 2400 bps devoted to digitized voice, 1200 bps of Forward Error Correction, 950 bps for data such as from a GPS receiver, and the rest is overhead - callsign, repeater being used, etc. in a 6.25 kHz channel.

In the [Icom ID-51A portable D-Star radio](#), Icom introduced DV Fast Data Mode:

By using data in place of voice frames, the ID-51A transfers data 3.5 times faster (3480 bps) than in the conventional DV mode (with voice). Pictures taken by an Android™ device can be quickly transmitted in the DV Fast Data mode.

DV Fast Data Mode has *not* been universally implemented in Icom D-Star radios, nor was it implemented in the Kenwood TH-D74A portable D-Star radio, nor (to my knowledge) any of the open source implementations of D-Star. Thus it's an open question if Icom will implement DV Fast Data Mode in the SHF-P1.

With the inclusion of "DD Mode" - 128 kbps data-only mode that Icom first offered in the [discontinued] ID-1 (1240-1300 MHz) and DD Mode for 1240-1300 MHz in the Icom IC-9700, the SFH-P1 is now "officially" *Zero Retries Interesting* for offering a unique new data mode for 2.4 GHz and 5.6 GHz Amateur Radio bands.

But, that's simultaneously disappointing, because DD Mode is now more than two decades old, and as mentioned, could have been implemented better then, and (as far as I've been able to determine) has not advanced since then.

I also asked Icom booth staff (several different ones through the course of Hamvention) if the SHF-P1 would be adapted for, or a version of it made for use with the QO-100 geostationary Amateur Radio payload positioned above Europe and Africa (2.4 GHz uplink, 10 GHz downlink). The answers were shrugs, "I don't know"s, and "what's QO-100"?

It will be interesting to watch the evolution of the SHF-P1.

Phil Karn KA9Q-Radio Presentation

The second-ranked Digital Retries Interesting thing seen at Hamvention 2022 was Phil Karn KA9Q's presentation of his [ka9q-radio project](#) during the Digital Modes Forum on Saturday Afternoon. It could be argued that since ka9q-radio is "shipping" (available on GitHub), it's more interesting than the SHF-P1 which at the moment is vaporware. Sometimes sexy-looking hardware trumps software.

From ka9q-radio's GitHub page:

ka9q-radio is a software defined radio for Linux I've been working on for a few years. It is very different from most other amateur SDRs in several respects:

- 1. Efficient multichannel reception. A single Raspberry Pi 4 can simultaneously demodulate, in real time, every NBFM channel on a VHF/UHF band (i.e., several hundred) with plenty of real time left over.*
- 2. All I/O (both signal and control/status) uses IP multicasting. This makes it easy for more than one module, on the same computer or on a LAN, to operate on the outputs of other modules, or for individual modules to be restarted without restarting everything else.*

The hardware components of KA9Q's system are a reasonable performance Software Defined Receiver such as an [Airspy](#) unit (specifically mentioned by KA9Q) and a Raspberry Pi 4, and a general purpose host computer. The SD Receiver is connected to the Raspberry Pi 4 and the ka9q-radio software on the raspberry Pi 4 virtualizes the SD Receiver into as many virtual receivers and modems as you wish, within the bandwidth of the SD Receiver. With three SD Receivers (and, I think, 3 Raspberry Pi 4s) KA9Q is able to monitor all the Narrow Band FM (NBFM) frequencies in use (repeater outputs, mostly) in his area (San Diego, CA) on 144-148 MHz, 222-225 MHz, and 440-450 MHz. *Currently, as research, he records all of those channels to disk.*

To me, what was interesting was that each channel could be simultaneously decoded for any number of "modes", such as FM voice, 1200 bps Audio Frequency Shift Keying (AFSK) Automatic Packet Reporting System (APRS).

The "magic" of KA9Q's approach is that the output of the SD Receiver is shared to many processes on the Raspberry Pi via the underutilized, poorly understood, and often poorly implemented technique of [IP Multicast](#). KA9Q goes to some trouble to explain in his GitHub documentation how to choose equipment such as Ethernet switches that implement IP Multicast correctly so ka9q-radio will work.

Besides the "fun" of being able to monitor all of 50-54 MHz, 144-148 MHz, 222-225 MHz, 440-450 MHz, and at least some of 1240-1300 MHz, I can think of a number of practical uses for ka9q-radio such as setting up relatively inexpensive, but highly capable remote receivers in quiet places. I can imagine a future "shack" of mine to have one ka9q-radio receiving system for VHF / UHF and only transmitters, allowing full duplex operations.

It's early days for ka9q-radio, and one thing that was encouraging about KA9Q's projects is that he meticulously documents them. I look forward to trying to get ka9q-radio running for myself later in 2022.

Amateur Radio Digital Communications - ARDC



ARDC Exhibit at Hamvention 2022. In the foreground is Bob McGwier N4HY and Ria Jairam N2RJ. Those in white lab coats are members of HamSCI. Photo by Steve Stroh N8GNJ

The ARDC exhibit in Building 1 was a gathering point for ARDC grant recipients and ARDC staff. Those representing ARDC included all five ARDC staff members:

- Executive Director Rosy Schechter KJ7RYV
- Grants Manager Chelsea Párraga KF0FVJ
- Communications Manager Dan Romanchik KB6NU
- Outreach Manager John Hays K7VE
- Operations Manager Merideth Stroh KK7BKI

and two ARDC Board Members:

- President / CEO Phil Karn KA9Q
- Director Robert McGwier N4HY

In my periodic visits, ARDC's exhibit was usually busy. It was amusing to watch the interaction of some those who had never heard about ARDC, but saw "Digital" and asked what digital devices ARDC made? At times, ARDC's mission got abbreviated to "We give out money" and that very quickly refocused the conversation.

ARDC Grant Recipients attending Hamvention 2022 all found their way to the ARDC exhibit at some point during Friday and Saturday, and the photo above was typical of the spontaneous discussions that sprung up near ARDC as smart, interesting people met each other. Because of their extensive histories and accomplishments in Amateur Radio, KA9Q and N4HY were particularly busy talking to their fans and colleagues.

Discussions with ARDC staff were that they explained ARDC's mission to many, many Hamvention attendees and handed out many hundreds of ARDC stickers and brochures, with promises that the attendee would be discussing the possibilities of ARDC grants with their clubs upon their return from Hamvention.

Again, more to follow of my impressions of Hamvention 2022 in subsequent issues of Zero Retries.

Join the *Fun* on Amateur Radio

If you're not yet licensed as an Amateur Radio Operator, and would like to join the fun by *literally having a license to experiment with radio technology*, check out

Join the Fun on Amateur Radio for some pointers.

Closing the Channel

In its mission to highlight technological innovation in Amateur Radio, promote Amateur Radio to techies as a literal license to experiment with wireless technology, and make Amateur Radio more relevant to society in the 2020s and beyond, Zero Retries is published via email and web, and is available to anyone at no cost. Zero Retries is proud *not to participate* in the Amateur Radio Publishing Industrial Complex, which hides Amateur Radio content behind paywalls.

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- Tina Stroh KD7WSF for, well, *everything!*
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- [Southgate Amateur Radio News](#) consistently surfaces "Zero Retries Interesting" stories.
- The [Substack email publishing platform](#) makes Zero Retries possible. I recommend it for publishing newsletters.

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More bits from Steve Stroh N8GNJ:

- [SuperPacket blog](#) - *Discussing new generations of Amateur Radio Data Communications - beyond Packet Radio (a precursor to Zero Retries)*
- [N8GNJ blog](#) - *Amateur Radio Station N8GNJ and the mad science experiments at N8GNJ Labs - Bellingham, Washington, USA*

Thanks for reading!

Steve Stroh N8GNJ / WRPS598 (He / Him / His)

These bits were handcrafted in beautiful Bellingham, Washington, USA

2022-05-27

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